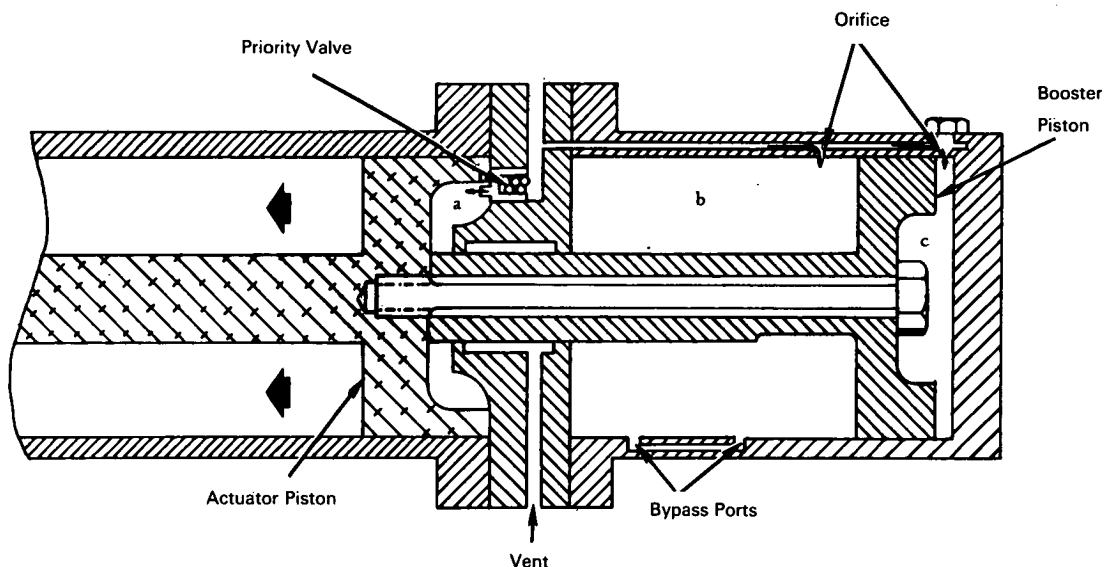


NASA TECH BRIEF



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Actuator Device Schedules Rate of Valve Closure



The problem:

To devise a means of scheduling the closure rate of a valve to limit surge pressure upon closure.

The solution:

A prevalue actuator that is spring loaded to produce a normally open valve and pneumatically powered to close the valve. The closure rate is controlled by pneumatic snubber and booster circuitry.

How it's done:

The snubber circuitry schedules the valve closure in order to limit surge pressure. The booster circuitry augments a piston output at or near the point of complete valve closure when additional input torque is required.

The application of closing (gas) pressure fills chambers a, b, and c at essentially equal rates. The fill rates are controlled by fixed orifices in chambers b and c, and by a priority valve (variable orifice) in chamber a. The application of pressure starts the valve closure cycle by a force (pressure) buildup across the actuator piston.

As the actuator piston moves and forces the valve toward the closed position, the priority valve no longer contacts the actuator piston; thus permitting a relatively unrestricted flow of gas into chamber a. The inlet orifice to chamber b is then covered by the booster piston; thereby initiating a compression cycle in chamber b. This results in a snubbing action on the valve.

(continued overleaf)

Further travel of the valve toward the closed position causes the booster piston to uncover bypass ports between chambers b and c. This equalizes the pressure across the booster piston and terminates the snubbing action.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B66-10686

Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: Whittaker Corp.
under contract to
Marshall Space Flight Center
(M-FS-1556)